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NOTES ON FROGS OF THE GENUS *TELMATOBIUS*

WITH DESCRIPTIONS OF TWO NEW PERUVIAN SPECIES

KARL P. SCHMIDT

CHIEF CURATOR, DEPARTMENT OF ZOOLOGY

The aquatic Andean frogs of the genus *Telmatobius* have attracted the attention of a succession of herpetologists on account of their remarkable adjustment to high altitudes and to cold waters. It adds to the interest of the group that the species adjust also to the waters of hot springs and several species appear to be confined to such thermal waters. Since my redescription of *Telmatobius peruvianus*, the type species of the genus, in 1928, from essentially topotypical specimens collected by my colleague Colin Campbell Sanborn near Tacna, Peru, both he and I have continued to collect these frogs at every opportunity. We have thus accumulated considerable collections in Chicago Natural History Museum. I had borrowed other collections in the hope of reviewing the genus, when the appearance of an excellent and comprehensive paper by Dr. J. Vellard (1951) on *Telmatobius* and allied forms makes such a review unnecessary. Dr. Vellard has, in fact, accomplished exactly what was needed in the genus, namely, the definition and establishment of the two widespread species *marmoratus* and *jelski*, together with an account of the variation of their constituent populations.

In my own preliminary studies of Peruvian *Telmatobius* I had found wide differences in the size of the spines on the highly developed "thumb-pad" of the breeding male. Such secondary sex characters have always proved to be an extremely useful key to definitive taxonomic definition of species, and they are not much employed by Vellard, who describes them only in general terms. I accordingly wish to describe two new forms distinguished on this basis, respectively from the areas assigned in Dr. Vellard's paper to

jelski and *marmoratus*. I am especially grateful to the Museum of Zoology of the University of Michigan for the loan of a specimen designated as the type of one of the new forms.

Telmatobius rimac, sp. nov.

Type.—University of Michigan, Museum of Zoology, no. 55596, adult male, from the Río Blanco, tributary of the Río Rimac, Peru, at an altitude of about 10,000 feet. Collected by C. H. Eigenmann and W. R. Allen, September 18, 1918.

Diagnosis.—A frog with stocky body; skin smooth; no trace of tympanum; vomerine teeth well developed; toes webbed to tips, but webs emarginate; a strong fold extending backward from the eye, expanding to form a parotoid gland; inner and outer metatarsal tubercles well defined; spines of pad on first finger of male very fine and closely set, eight in one millimeter.

Description of type.—A *Telmatobius* of moderate size, the ventral surface yellowish; vomerine teeth very large, each group equal in size to one of the large choanae; dorsal skin entirely smooth, ventral skin with transverse plicae; no trace of tympanum; toes fully webbed, webs emarginate between toe-tips; inner and outer metatarsal tubercles well defined; metatarsals partly separated; a strong glandular fold extending backward from the eye to above the arm, widening posteriorly to form a parotoid gland, which, however, is not evident from above; snout short, rounded in profile; nostrils as far apart as their distance from the eye.

Dark brown above, without markings; dark yellowish brown beneath, with darker spots.

Nuptial pad on first finger minute, closely set spines, eight in line in one millimeter; arm greatly thickened; no spines on arms or chest.

Measurements of type.—Length 57 mm., width of head 21 mm., hind leg 89 mm., tibia 28 mm., arm 34 mm.

Notes on paratypes.—Three specimens (C.N.H.M. no. 34224) collected by myself at Huinco, Rimac River, at the power dam above Lima, September 1, 1939, are transforming or just transformed individuals. One with a body length of 34 mm. has a stub of tail 13 mm. long. The largest specimen, measuring 38 mm., has no trace of a tail.

Comparisons.—The Rimac Valley species is distinguished from the widespread *Telmatobius jelski* because of the unmistakable dif-

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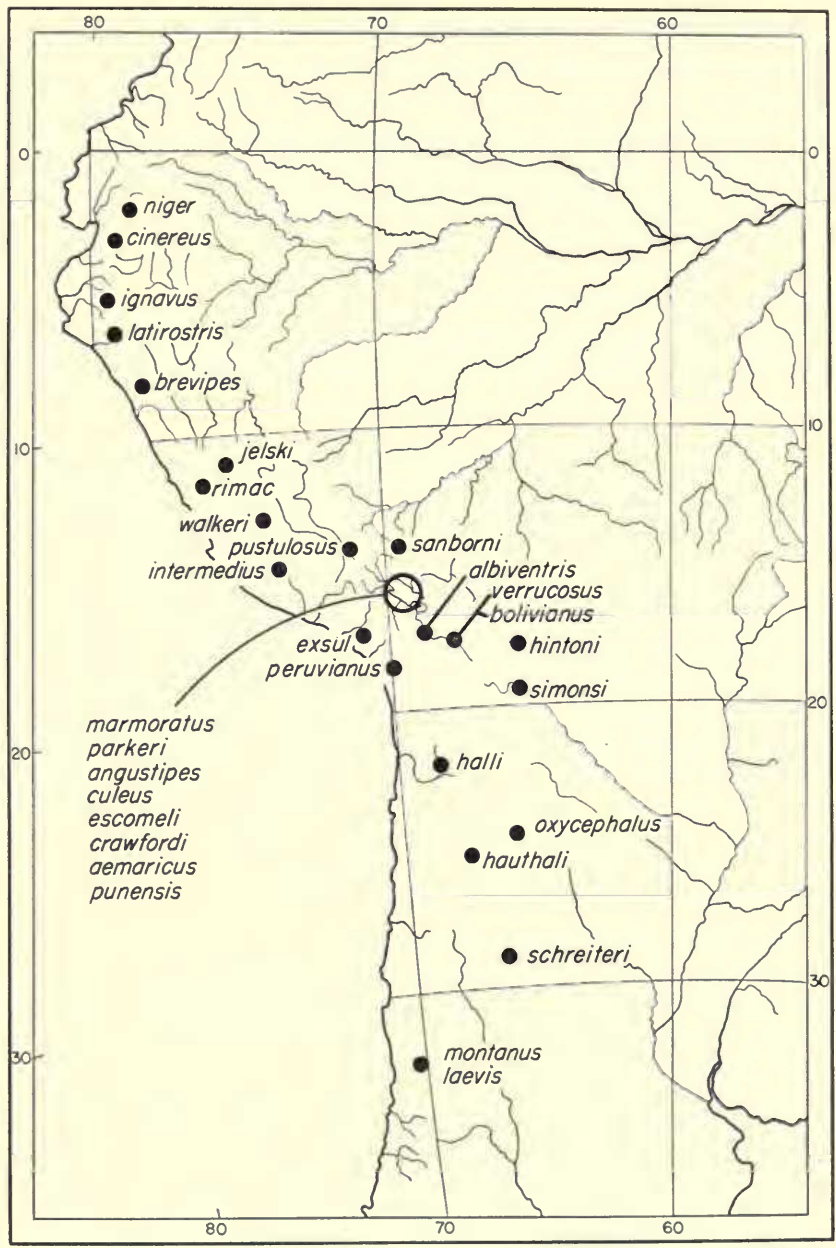


FIG. 46. Map of western South America, showing the type localities of the species of *Telmatobius* (including forms in synonymy).

ference in the spines of the thumb-pad of the breeding male. There are eight spines to the millimeter, as compared with four to the millimeter in the large series of *Telmatobius jelski*, with which the type has been compared. Vellard refers specimens from Sta. Eulalia in the Rimac Valley to *jelski*. *Telmatobius rimac* differs sharply from *marmoratus* (which also has small spines on the thumb) in its more fully webbed toes.

***Telmatobius sanborni*, sp. nov.**

Type.—Chicago Natural History Museum no. 40247, adult male, from Limbani, Puno, Peru, about 13,000 feet altitude. Collected October 1, 1941, by Colin Campbell Sanborn.

Diagnosis.—A *Telmatobius* with deeply emarginate webs, dorsal skin strongly tuberculate, a projecting lateral fold, parotoids well developed, strong vomerine teeth in transverse rows, and with first finger of male armed with large spines (three in two millimeters).

Description of type.—Habitus of typical *Telmatobius marmoratus*; no tympanum; a laterally projecting parotoid gland, beginning as a fold behind the eye; a post-rectal gland sharply set off by folds; dorsal skin strongly tuberculate, with a lateral fold, below which the sides are smooth; ventral skin granulate or plicate; vomerine teeth in strongly developed, transverse series, projecting laterally beyond the inner borders of the small choanae; toes with a fringe of web to the tips, but webs very deeply emarginate, first toe essentially free, as are three distal phalanges of fourth toe; an elongate inner metatarsal tubercle, two-thirds the length of the inner toe; outer metatarsal tubercle small, round, distinct.

Dark gray above, lighter beneath.

Arm enormously hypertrophied, the inner finger bearing a raised pad covered with large spines, which measure about 0.66 mm. in diameter at the base, that is, three spines to two millimeters; scattered spines on arms and breast.

Measurements of type.—Length of body 60 mm.; width of head at angles of jaws 27 mm.; hind leg 96 mm.; tibia 32 mm.; (arm not extendable), diameter of arm at elbow 13 mm.

Notes on paratypes.—Five males (nos. 67435–67438 and 40248a), the largest measuring 65 mm. from snout to anus, correspond with the description of the type. The nine female specimens (no. 40248) range in size from 26 mm. to 48 mm. In the largest specimen the hind leg measures 83 mm., tibia 26 mm., arm 32 mm., width of head

18 mm. In some of these specimens the dorsal tubercles are seen to correspond to black spots, and the inner faces of thigh and tibia may be yellow.

Comparisons.—While this species is most naturally to be compared with *Telmatobius marmoratus*, it appears to be much more distinct from *m. marmoratus* of the Lake Titicaca region than are *m. pustulosus* of Cuzco or *m. hintoni* of Bolivia. Limbani is in the drainage of the Río Inambari, and the range of the new form presumably extends downward from that locality to the limits of cold water. *Telmatobius sanborni* differs from all other species examined in the larger size of the tubercles on the first finger of the breeding male.

Telmatobius escomeli exsul Vellard

Telmatobius escomeli exsul Vellard, 1951, Mem. Mus. Hist. Nat. "Javier Prado," 1: 66, fig. 19—Pozo de agua junto a las termas de Yura, cerca de Arequipa, 2,575 meters.

Vellard records specimens of *Telmatobius marmoratus* from the vicinity of the hot springs of Jesús, from a warm spring at Arequipa, and from a "pozo de agua tibia" at the hot springs of Yura. Specimens from the Arequipa region in Chicago Natural History Museum collections average much larger than the *marmoratus* recorded by Vellard, and thus require comparison with *exsul*. They are quite evidently not *marmoratus*.

CHECK LIST OF SPECIES

Boulenger recognized six species of *Telmatobius* in 1882, and by 1920 this had risen to thirteen, after the exclusion of the species of *Cyclorhamphus* (Barbour and Noble, 1920). Parker (1940) confirms the suggestion of Barbour and Noble that *Telmatobius marmoratus* Duméril and Bibron is from Peru, not Chile; he greatly clarifies the ecological relations of the species characterized by an extremely baggy skin, which appears especially in the lacustrine forms; and he describes five new forms. Vellard finally (1951) recognizes nineteen species, of which four are divided into subspecies, making twenty-five forms in all. Following Vellard's classification closely, except as to the sub-specific arrangement of *albiventris*, with a few additional references, the following list results.

It is hoped that the arrangement of the species according to the north-south latitudes of their type localities, which are shown

on the accompanying map, may be suggestive for further subspecific reclassification.

Telmatobius Wiegmann

Telmatobius Wiegmann, 1835, Nova Acta Acad. Leop. Carol., 17: 262—
type: *peruvianus*.

Pseudobatrachus Peters, 1873, Monatsber. Akad. Wiss. Berlin, 1873: 414—
type: *jelskii*.

Telmatobius niger Barbour and Noble

Telmatobius niger Barbour and Noble, 1920, Bull. Mus. Comp. Zool., 63:
413, fig. 4—Palmira desert, 10,500 feet altitude, Ecuador (=vicinity of
Palmira, Chimborazo Province).

Telmatobius cinereus Noble

Telmatobius cinereus Noble, 1921, Amer. Mus. Nov., 29: 6—Bestion [Azuay],
Ecuador.

Telmatobius ignavus Barbour and Noble

Telmatobius ignavus Barbour and Noble, 1920, Bull. Mus. Comp. Zool., 63:
414, fig. 5—Huancabamba, Piura, Peru.

Telmatobius latirostris Vellard

Telmatobius latirostris Vellard, 1951, Mem. Mus. Hist. Nat. "Javier Prado,"
1: 68, fig. 22—Cutervo, Cajamarca, Peru.

Telmatobius brevipes Vellard

Telmatobius brevipes Vellard, 1951, Mem. Mus. Hist. Nat. "Javier Prado,"
1: 71, figs. 20–21—Huamachuco, Libertad, Peru.

Telmatobius jelski Peters

Pseudobatrachus jelskii Peters, 1873, Monatsber. Akad. Wiss. Berlin, 1873:
415, pl. 4, fig. 1—Acancocha, Junín, Peru.

Telmatobius jelskii Boulenger, 1882, Cat. Batr. Sal. Brit. Mus., p. 191.

Telmatobius rimac, sp. nov.

See page 278.

Telmatobius walkeri Shreve

Telmatobius walkeri Shreve, 1941, Proc. New England Zool. Club, 18: 79—
Rapi, 108 km. east of Ayacucho, Ayacucho, Peru.

Telmatobius sanborni, sp. nov.

See page 280.

Telmatobius intermedius Vellard

Telmatobius intermedius Vellard, 1951, Mem. Mus. Hist. Nat. "Javier Prado," 1: 29, fig. 2—Allipacca, near Puquio, Ayacucho, Peru.

Telmatobius marmoratus Duméril and Bibron

Cyclorhamphus marmoratus Duméril and Bibron, 1841, Erpet. Gen., 8: 455—Guasacona, Chile (=Guasacoma, Puno, Peru).

Telmatobius marmoratus Boulenger, 1882, Cat. Batr. Sal. Brit. Mus., p. 192.

Cyclorhamphus aemaricus Cope, 1874, Proc. Acad. Nat. Sci. Phila., 125—Lake Titicaca, Puno, Peru.

Cyclorhamphus angustipes Cope, 1877, Proc. Amer. Phil. Soc., 17: 38—Juliaca, Puno, Peru.

Telmatobius marmoratus marmoratus Duméril and Bibron

Telmatobius marmoratus marmoratus Parker, 1940, Trans. Linn. Soc. London, (3), 1: 208, fig. 1.

Telmatobius marmoratus pustulosus Cope

Cyclorhamphus pustulosus Cope, 1877, Proc. Amer. Phil. Soc., 17: 39—Tinta, Cuzco, Peru, 11,400 feet altitude.

Telmatobius marmoratus pustulosus Parker, 1940, Trans. Linn. Soc. London, (3), 1: 208, fig. 2.

Telmatobius marmoratus hintoni Parker

Telmatobius hintoni Parker, 1940, Trans. Linn. Soc. London, (3), 1: 209, fig. 3—Tolota, Cochabamba, Bolivia (=Tolata).

Telmatobius marmoratus hintoni Vellard, 1951, Mem. Mus. Hist. Nat. "Javier Prado," 1: 38.

Telmatobius culeus Garman

Cyclorhamphus culeus Garman, 1875, Bull. Mus. Comp. Zool., 3: 276, pl. —Lake Titicaca, off Achacache, 11 fathoms depth.

Telmatobius culeus Barbour and Noble, 1920, Bull. Mus. Comp. Zool., 63: 416.

Telmatobius culeus culeus Garman

Telmatobius culeus culeus Parker, 1940, Trans. Linn. Soc. London, (3), 1: 210, fig. 5.

Telmatobius culeus albiventris Parker

Telmatobius culeus albiventris Parker, 1940, Trans. Linn. Soc. London, (3), 211, fig. 6—Lago Pequeno, Lake Titicaca (near Taquiri Island and Taraco Point).

Telmatobius culeus punensis Vellard

Telmatobius albiventris punensis Vellard, 1951, Mem. Mus. Hist. Nat. "Javier Prado," 1: 57—Isla Amantani, opposite the town of Puno, Puno, Peru.

Telmatobius culeus parkeri Vellard

Telmatobius albiventris parkeri Vellard, 1951, Mem. Mus. Hist. Nat. "Javier Prado," 1: 58, fig. 15—Lake Arapa, north of Lake Titicaca.

Telmatobius escomeli Angel

Telmatobius escomeli Angel, 1923, Ann. Sci. Nat. (zool.), 6: 108—"Lake Titicaca" (corrected to Lagunilla Lagunilla, Puno, Peru).

Telmatobius escomeli escomeli Angel

Telmatobius escomeli escomeli Parker, 1940, Trans. Linn. Soc. London, (3), 1: 212, fig. 7.

Telmatobius escomeli crawfordi Parker

Telmatobius escomeli crawfordi Parker, 1940, Trans. Linn. Soc. London, (3), 1: 212, fig. 8—Lagunilla Saracocha, Puna, Peru.

Telmatobius escomeli exsul Vellard

Telmatobius escomeli exsul Vellard, 1951, Mem. Mus. Hist. Nat. "Javier Prado," 1: 66, fig. 19—pond near the hot springs at Yura, Arequipa, Peru.

Telmatobius verrucosus Werner

Telmatobius verrucosus Werner, 1899, Zool. Anz., 22: 482—Chaco, Bolivia (=Chaco, on the Unduavi River, 25 km. northwest of Puente de la Via), La Paz, Bolivia.

Telmatobius bolivianus Parker, 1940, Trans. Linn. Soc. London, (3), 1: 213, fig. 9—same locality as for *verrucosus*.

Telmatobius peruvianus Wiegmann

Telmatobius peruvianus Wiegmann, 1835, Nova Acta Acad. Leop. Carol., 17: 262, pl. 22, fig. 2—Peru (Cordillera de Guatilla, near Palca, two days' journey east of Tacna).

Telmatobius simonsi Parker

Telmatobius simonsi Parker, 1940, Trans. Linn. Soc. London, (3), 1: 210, fig. 4—Sucre, Chuquisaca, Bolivia.

Telmatobius halli Noble

Telmatobius halli Noble, 1938, Amer. Mus. Nov., 963: 1—Ollague, Antofagasta, Chile, 10,000 feet altitude.

Telmatobius oxycephalus Vellard

Telmatobius oxycephalus Vellard, 1946, Acta Zool. Lilloana, 3: 320—Cerro de Escalera, Salta, Argentina, 3,800 meters altitude.

Telmatobius hauthali Koslowsky

Telmatobius hauthali Koslowsky, 1895, Rev. Mus. La Plata, 6: 359, pl. 1—Aguas Calientes, near Cazadero Grande, Catamarca Argentina, 4,000 meters altitude.

Telmatobius hauthali hauthali Koslowsky

Telmatobius hauthali hauthali Vellard, 1951, Mem. Mus. Hist. Nat. "Javier Prado," 1: 79.

Telmatobius hauthali schreiteri Vellard

Telmatobius schreiteri Vellard, 1946, Acta Zool. Lilloana, 3: 321—Aimogasta, La Rioja, Argentina.

Telmatobius hauthali schreiteri Vellard, 1951, Mem. Mus. Hist. Nat. "Javier Prado," 1: 80.

Telmatobius laevis Philippi

Telmatobius laevis Philippi, 1902, Suppl. Batr. Chilenos, p. 4—Potrero, Chile (=Potrero Grande, Province of Aconcagua, cf. Müller, 1938).

Telmatobius montanus Philippi

Telmatobius montanus Philippi, 1902, Suppl. Batr. Chilenos, p. 47—lake in the high Andes, Province of Santiago, Chile (believed by Müller, 1938, to be near Potrero Grande, Province of Aconcagua).

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